DOCUMENT RESUME

ED 237 341 SE 043 552

AUTHOR	Lucy, Jon
TITLE	Handle with Care! Mid-Atlantic Marine Animals That Demand Your Respect. Educational Series No. 26. Third Printing.
INSTITUTION	Virginia Inst. of Marine Science, Gloucester Point, Va.
SPONS AGENCY	National Oceanic and Atmospheric Administration (DOC), Rockville, Md. National Sea Grant Program.
PUB DATE	Jul 83
GRANT	NA79AA-D-00055
NOTE	22p.
AVAILABLE FROM	Sea Grant Communications Office, Virginia Institute of Marine Science, Gloucester Point, VA 23062 ($1.50 each).
PUB TYPE	Guides - General (050) -- Reference Materials - General (130)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Animals; *First Aid; *Ichthyology; *Injuries; *Marine Biology; Public Health; Science Education; *Wildlife
IDENTIFIERS	Jellyfish; *Sharks; Stingrays

ABSTRACT

Generally speaking, marine organisms found along middle Atlantic shores are not considered threatening to people. However, some of these animals can cause problems, either upon simple contact with the skin, as in the case of some jellyfish, or through careless handling. In addition, larger inhabitants of coastal waters (such as sharks) must always be treated with great respect because of the danger potential and their unpredictable nature. Descriptions of nuisance and potentially harmful organisms are therefore provided to help coastal residents and visitors become more aware of how problems with such marine animals might develop, how they can be avoided, and how certain injuries should best be treated if they occur. Animals described include: (1) jellyfish (stinging or sea nettle, lion's mane jellyfish, moon jelly, portuguese man-o-war, mushroom jelly, comb jelly); (2) sharks (sandbar, bull, dusky, tiger/hammerhead, sand tiger, Atlantic angel and mako sharks, and the spiny dogfish); (3) stingrays (bluenose stingray, cownose ray, roughtail stingray); and (4) unassuming problem fish and crabs (including toadfish, puffers, bluefish, black sea bass, blue crab, and others). (JN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

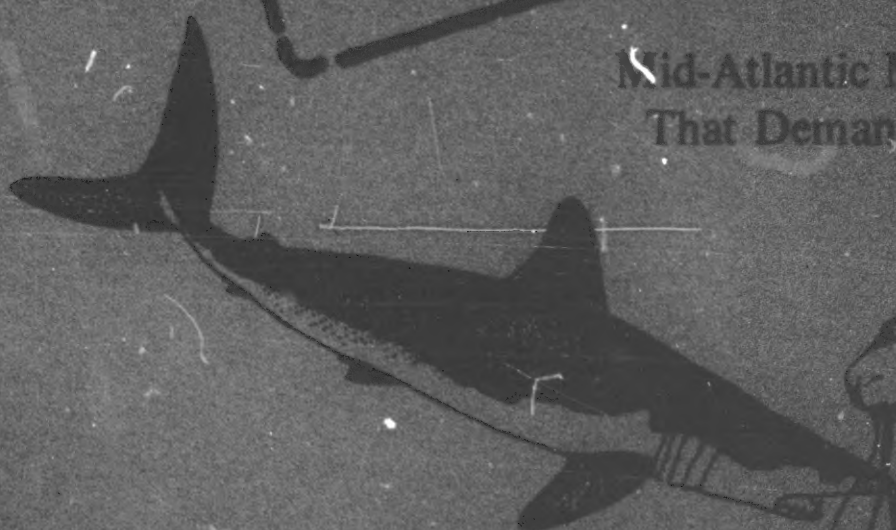
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED237341

HANDLE WITH CARE!

Mid-Atlantic Marine Animals That Demand Your Respect

Jon Lucy



"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY
Jon A. Lucy
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SE043552

Copies of this publication may be ordered for $1.50 each
from the Sea Grant Communications Office,
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

HANDLE WITH CARE

Mid-Atlantic Marine Animals That Demand Your Respect

by Jon Lucy

Marine Recreation Specialist,
Sea Grant Marine Advisory Services,
Virginia Institute of Marine Science

and Instructor,
School of Marine Science
College of William and Mary

Design by Kym Young
Illustrations by Dick Cook

Educational Series No. 26
Third Printing July 1983

A Publication of the Virginia Sea Grant Program
Marine Advisory Services
Virginia Institute of Marine Science, College of William and Mary
Gloucester Point, VA 23062

ACKNOWLEDGEMENTS

The author wishes to express appreciation for review of portions of this manuscript to the following VIMS staff members: Dr. John Merriner, Dr. John Musick and Mr. Clarence Richards of the Department of Ichthyology; and Dr. Paul Zubkoff of the Department of Environmental Physiology. Drafts of this report were prepared by the VIMS Report Center. Final composed copy of the report was prepared by Mrs. Cheryl Teagle, VIMS Sea Grant Program.

This work is a result of research sponsored (in part) by the Virginia Institute of Marine Science Institutional Sea Grant Program, supported by the Office of Sea Grant, NOAA, under Grant Number NA79AA-D-00055. The U. S. Government is authorized to produce and distribute reprints for governmental purposes not withstanding any copyright notation that may appear hereon.

CONTENTS

INTRODUCTION ii

JELLYFISH 1

- STINGING OR SEA NETTLE 1
- LION'S MANE JELLYFISH 2
- MOON JELLY 2
- PORTUGUESE MAN-O-WAR 2
- MUSHROOM JELLY 3
- COMB JELLY 3

TREATMENT OF JELLYFISH STINGS 3

SHARKS 4

- SANDBAR SHARK 4
- BULL SHARK 5
- DUSKY SHARK 5
- TIGER AND HAMMERHEAD SHARKS 5
- SAND TIGER SHARK 6
- ATLANTIC ANGEL AND MAKO SHARKS 6
- SPINY DOGFISH 6

SHARK ATTACKS 7

STINGRAYS 9

- BLUNTNOSE STINGRAY 9
- COWNOSE RAY 10
- ROUGHTAIL STINGRAY 10

TREATMENT OF STINGRAY WOUNDS 11

UNASSUMING PROBLEM FISH AND CRABS 11

REFERENCES 14

INTRODUCTION

GENERALLY SPEAKING, THE MARINE organisms found along middle Atlantic shores are not considered threatening to people. However, some of these animals can cause problems, either upon simple contact with the skin, as in the case of some jellyfish, or through careless handling. Larger inhabitants of coastal waters, such as stingrays and sharks, must always be treated with great respect because of the danger potential and their unpredictable nature. The following description of nuisance and potentially harmful organisms is presented to help coastal residents and visitors become more aware of how problems with such marine animals might develop, how they can be avoided and how certain injuries should best be treated if they occur.

All mid-Atlantic coastal animals that can cause problems for the uninitiated beachgoer or angler are not discussed herein. Common sense and caution must be exercised upon encountering any unfamiliar animal. A quick check with local residents, lifeguards or marina operators before heading out on the water or beach will often prevent problems later. Knowledge prevents surprise and makes for more enjoyable outings. Play it smart, be observant and enjoy the fullest recreational potential of our coastal waters.

JELLYFISH

Stinging Nettle

STINGING OR SEA NETTLE -
Chrysaora quinquecirrha

This is the animal that causes the most aggravation to swimmers. In the western Atlantic it occurs primarily in bays and estuaries from New England to Brazil. Along middle Atlantic shores, Chesapeake Bay appears to support the most dense populations. Nettles appear in significant numbers in the Chesapeake in late June or early July, usually disappearing by mid-September. The only known natural enemies of the stinging nettle are sea turtles and the orange filefish which include these and other jellyfish in their diets.

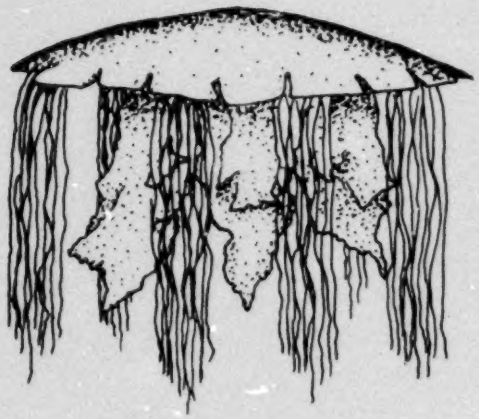
The stinging nettle is usually whitish in color but may exhibit red streaks in its umbrella and tentacles. Commonly called "blood-sucker," the red phase exhibits no greater stinging capacity than the white, nor are the two phases different in other characteristics. The significance of the red color is not known. The stinging nettle's umbrella generally is less than six inches (15 centimeters) in diameter, while the tentacles may extend up to three feet (0.9 meter) in length.

The sting, as is the case with all jellyfish, is caused by the discharge of batteries of microscopic stinging cells (nematocysts) located on the animal's tentacles. Each cell contains a coiled tube that discharges rapidly when a sensor hair or "trigger" touches an object. When the object is part of a swimmer's body, the discharged tube penetrates the skin and a toxin is injected.

While the stinging nettle is not considered a dangerous organism, reactions to its sting range from mild to severe, depending upon the number of tentacles (or jellyfish) contacted, the amount of contact time and an individual's sensitivity to the toxin. Stings generally produce pain ranging from a mild prickling sensation to a violent burning, throbbing or shooting pain. The pain may remain localized or radiate. The injured area usually turns red and a rash may develop as well as swelling. According to Dr. Findlay E. Russell, one of the world's foremost authorities on the nature of venoms and how to deal with them, even a mild bout with a stinging jellyfish can bring on tears, sweating, coughing and sneezing. A more severe sting can result in coughing, muscle cramps and a discharge of mucus in the respiratory tract together with a sensation of constriction in the chest (from an interview with Dr. Russell in *Emergency Medicine,* July 1978).

Dr. Russell also warns that jellyfish toxins can be allergenic. A person sensitive to jellyfish toxin can suffer anaphylactic shock (muscle weakness, paleness, dizziness, possible tremors and loss of consciousness potentially leading to death) from a single stinging. Repeated exposure to stings can make a nonsensitive person sensitive.

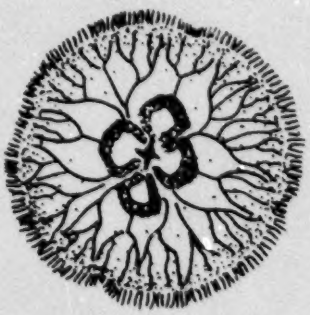
Lion's Mane



LION'S MANE JELLYFISH

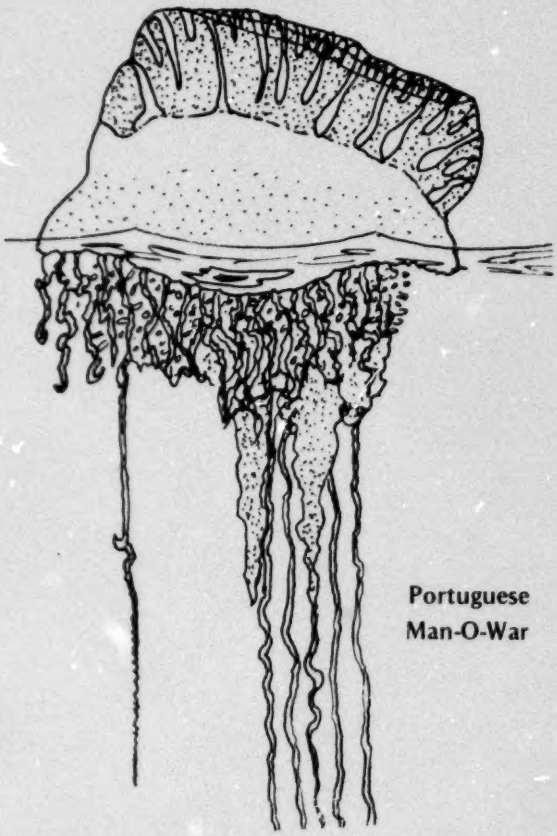
In late May or early June the winter or lion's mane jellyfish *(Cyanea capillata)* may still remain in estuarine and nearshore waters following its peak period of abundance from late winter to early spring. The umbrella varies in color from orange to red and the tentacles are fairly short, unlike those of the stinging nettle. The animal may produce a mild sting when contacted, but certain people are more sensitive to it than others. Sometimes in late July or August a more venomous form of the lion's mane jellyfish appears along Virginia's Eastern Shore beaches, having a sting about like that of the stinging nettle. While the jellyfish's umbrella seldom exceeds six inches (15 centimeters) in diameter in this region, individuals of six feet (1.8 meters) or more have been observed in the colder waters of the North Atlantic.

Moon Jelly



MOON JELLY

Another common and impressively large jellyfish appearing from midsummer to fall is the moon jelly or four-leafed-clover jellyfish *(Aurelia aurita)*. These animals have very small tentacles, but the umbrella may exceed 15 inches (38 centimeters) in diameter. The clover-like pattern seen through the middle of the umbrella is the result of four horseshoe-shaped reproductive organs which range in color from pink to yellow to grey. While contact with such a large jellyfish may prove disagreeable to swimmers, the animal generally only produces very mild stings in the Chesapeake Bay (some references claim it to be non-stinging). In the Caribbean the moon jelly is more venomous.

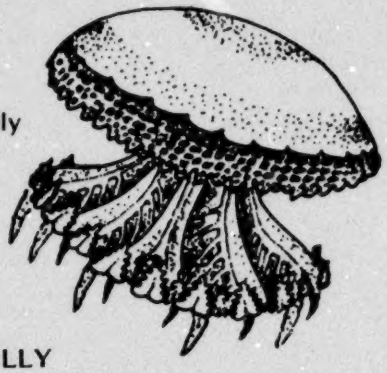


Portuguese Man-O-War

PORTUGUESE MAN-O-WAR

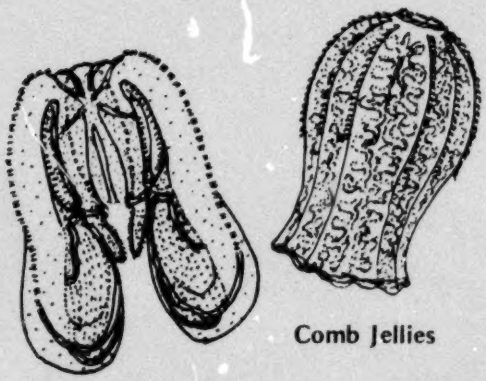
An infrequent visitor but quite a dangerous jellyfish, the Portuguese man-o- war *(Physalia physalis)*, is sometimes pushed onto mid-Atlantic beaches by offshore winds. Possessing a toxin as strong as cobra venom, this jellyfish is easily recognized by its reddish-purple, gas-filled float which may reach a maximum size of ten inches (25 centimeters) in length. When this jellyfish is in deep water, the highly contractile tentacles may extend 40-50 feet (12-15 meters) below the surface. Like most jelly-

fish, the tentacles of the man-o-war can still sting after the animal is washed up on the beach. Even the dried out remains of the jellyfish can deliver a painful sting. Common in the tropics, this jellyfish is carried northward by the Gulf Stream, occasionally as far as New England. When the man-o-war is blown inshore by storms, swimmers are advised to stay out of the water.



MUSHROOM JELLY

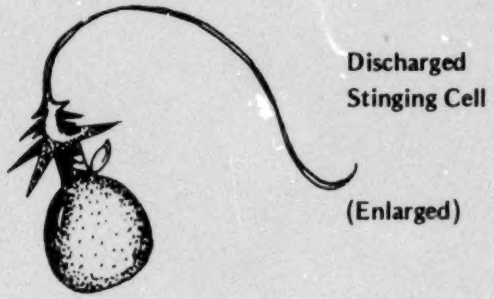
Attracting attention because of its different shape and fairly large size, the mushroom jelly *(Rhopilema verrilli)* is observed occasionally along ocean beaches and in the mouths of bays and sounds. Ranging from southern New England to Florida and along the Gulf coast, it generally appears in autumn or winter. Usually measuring 10-12 inches (25-30 centimeters) in diameter, individuals sometimes obtain diameters of 18-20 inches (46-51 centimeters). The color of the umbrella ranges from translucent or yellowish, while the "frilly" underparts are a mottled brownish red. The toxin of the mushroom jellies is non-venomous to man.



COMB JELLY

A final note on jelly-like animals concerns the comb jellies. These range from 1-4 inches (3-8 centimeters) in size and luminesce at night in boat wakes or when the water is otherwise disturbed. Several species are common in the mid-Atlantic coastal waters. These animals are almost transparent during the day but may occur in sufficient numbers to be felt in the water by bathers. They are non-stinging and harmless.

TREATMENT OF JELLYFISH STINGS



Dr. Russell emphasizes that, until you determine otherwise, each sting case should be treated as a medical emergency requiring immediate attention and the exercise of considerable judgement. The principles of treatment are the same for all jellyfish species.

Because most jellyfish stings received by people along middle Atlantic shores are mild in nature, local application of a diluted ammonia solution or vinegar may be the best and only treatment necessary for sting victims to achieve relief. In the Chesapeake Bay and Delaware Bay areas, it is popular for sting victims to apply unseasoned meat tenderizer to their stings, but the substance's effectiveness has not been clearly demonstrated. In other coastal areas around the country, sodium bicarbonate, boric acid, lemon juice, tannic acid, canned milk, alcohol, gasoline and many other agents have also been used. Dr. Russell feels the shift in pH brought about by applying these agents may be what reduces the pain of stings, but he has found that they do not help for anything but mild stings. If there are breaks in the skin of the area to be treated, meat tenderizer can cause discomfort, as can most of the other agents mentioned.

Treatment procedures recommended for severe

stings and those used with considerable success by lifeguard services are as follows:[1]

1. The affected person should leave or be taken from the water to prevent panic and possible drowning; medical assistance should be sought immediately.

2. Cool water in which the victim was swimming should be poured over the injured area. Don't use fresh water or hot water and don't rub with sand, since these actions will fire any undischarged stinging cells.

3. Attempt to remove any clinging tentacles, using gloves if available.

4. Pour alcohol (95% ethanol works better than rubbing alcohol), or ideally, formalin, over the injured area to fix the stinging cells and prevent additional discharges; diluted ammonia and vinegar will also work, but not as effectively. Keep all of these products, especially formalin, away from the eyes.

5. Dust the area with a dry powder such as flour or baking powder, or use sand if it's all that is available; the stinging cells will adhere to the particles.

6. Scrape off the powder with a knife. Don't use an extremely sharp instrument because it will cut the stinging cells rather than pulling them out of the skin.

7. Wash the area again with salt water and apply a corticosteroid - analgesic balm if one is available (obtained only by prescription).

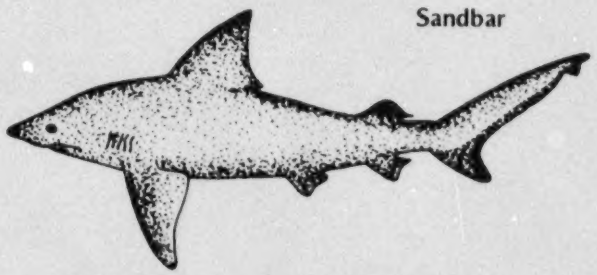
8. The victim should at all times be observed for adverse reactions to the toxin, including cardiac or respiratory arrest or shock. Any respiratory problems will almost always appear within minutes, usually as a severe asthmatic condition that may last for half an hour or longer.

1. Treatment References: *Jaws That Bite, Things That Sting, Emergency Medicine,* Vol. 10(7), 1978, Fisher Medical Publications, 280 Madison Ave., NY 10016 and *Guide to Common Jellyfishes of South Carolina* by D. Calder and M. Pridger, SC Sea Grant Marine Advisory Bulletin 11, SC Marine Resources Center, P. O. Box 12559, Charleston, SC 29412.

SHARKS

Sharks are not considered to be a significant threat to man along the middle Atlantic coast, but their size, strength, and unpredictable natures demand the utmost respect from bathers, anglers and divers. Of the approximately 250 species of sharks occurring throughout the world, 22 species frequent waters inshore of the Gulf Stream between Cape Cod and Cape Hatteras, as indicated by surveys of the National Marine Fisheries Service (NMFS).

Considering only inshore waters, the most abundant shark species along the Atlantic coast is the sandbar or brown shark *(Charcharhinus plumbeus).* Other sharks frequently observed or taken by anglers in middle Atlantic inshore waters are the bull *(C. leucas),* dusky *(C. obscurus),* hammerhead *(Sphyrna spp.),* sand tiger *(Odontaspis taurus),* tiger *(Galeocerdo cuvieri),* Atlantic angel shark *(Squatina dumerili)* and spiny dogfish *(Squalus acanthias).* Common offshore species include the silky shark *(C. falciformis),* blue shark *(Prionace glauca)* and mako, bonito, or sharpnosed mackerel shark *(Isurus oxyrinchus).*



Sandbar

SANDBAR SHARK

Sandbar sharks are frequently observed as juveniles in sounds and bays along the middle Atlantic states from spring to late fall, after which

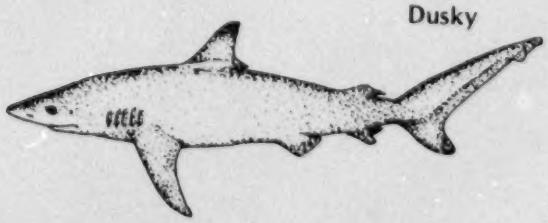
time they move offshore and south to wintering grounds between North Carolina and Florida. As the fish reach greater size they undertake longer north-south migrations over a range which covers waters from Long Island to southern Brazil. Adult females enter bays and sounds from New York to New Jersey to give birth. Maximum known size for this species is 7 feet 8 inches (2.34 meters) and a weight of 200 pounds (74.6 kilograms). Sandbar sharks feed primarily on bottom fishes such as sea robins, skates and flatfish. This shark largely supported a commercial shark fishery on Virginia's Eastern Shore during the 50's and 60's.

Bull

BULL SHARK

Best known for its consistent, though infrequent summertime appearances in commercial fishing gear far up mid-Atlantic bays and rivers, the bull shark is a robust and somewhat pugnacious species. Known to ascend estuaries, even into fresh water, eight-foot (2.4 meter) specimens are common. Bull sharks range from New York to Brazil, appearing in mid-Atlantic coastal waters from June through October. Prey consist primarily of smaller sharks (especially young sandbar sharks), rays, mackerel, tuna, crabs, other invertebrates and carrion. Bull shark sightings often turn out to be sandbar sharks. The primary distinguishing feature between the two species is that the bull shark, unlike the sandbar, exhibits no dermal ridge on its back between the dorsal fins.

Dusky



DUSKY SHARK

Dusky sharks are commonly found along Virginia/North Carolina ocean beaches during summer, being less abundant north of Virginia. Duskies are frequently mistaken for sandbar sharks, which have deeper bodies and higher first dorsal fins. The dusky shark ranges from New England's Georges Bank to southern Brazil and reaches a maximum size of 11 feet 8 inches (3.56 meters). Its diet is similar to that of the sandbar shark.

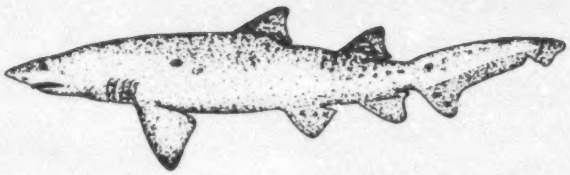
Tiger

TIGER AND HAMMERHEAD SHARKS

Of the common sharks frequenting inshore mid-Atlantic waters, the tiger and hammerhead sharks are traditionally considered the most dangerous to man. The tiger shark ranges from Massachusetts to Uruguay, and along Virginia's coast is generally found in shallower water during June through August. Tigers are usually less than 12-13 feet (3.7 - 3.9 meters) in length, but may reach 18 feet (5.5 meters). A 12-foot (3.7 meters) individual will normally weigh 700-1000 pounds (261 - 373 kilograms). Tiger sharks feed on all kinds of finfish, stingrays and other sharks. Their stomachs frequently contain such things as garbage remains, empty sacks and tin cans, thrown from ships at sea.

Hammerhead

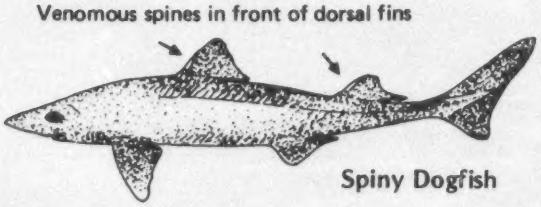
Hammerheads appear occasionally in inshore and estuarine waters during summer and fall, and may be represented by any one of three species (smooth, scalloped or bonnethead). However, the scalloped hammerhead *(Sphyrna lewini)* is the more abundant species inshore during August and September.



Sand Tiger

SAND TIGER SHARK

Another potentially dangerous shark occasionally visiting inshore waters during summer and fall is the sand tiger. This shark, ranging from the Gulf of Maine to southern Brazil, is recognized by its snaggletoothed appearance. Another distinguishing feature of this fish is that it releases bubbles of gas from its mouth when it is hooked and is being brought up through the water column. One of the most common large sharks during summer months, the sand tiger commonly grows to 7-8 feet (2.1 - 2.4 meters) with maximum size being recorded as 10 feet 5 inches (3.2 meters). Sand tigers feed on such species as black drum, bluefish, butterfish, eels, flatfish and menhaden.



Spiny Dogfish

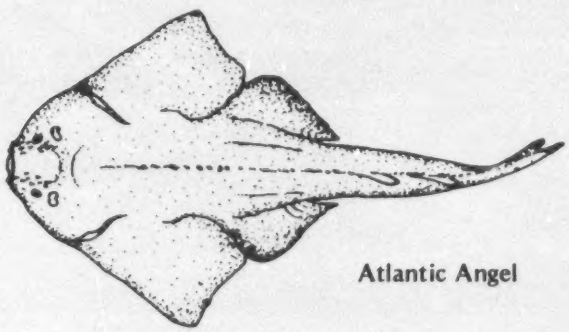
SPINY DOGFISH

Special attention must be given the spiny dogfish, which reaches a maximum length of four feet (1.2 meters) and is taken by surf fishermen along the beaches in early spring and late fall. These are the times when this species migrates through a range which extends from Labrador to South Carolina. Dogfish have sharp, strong, venomous spines immediately in front of each of their two dorsal fins. When handled, a dogfish has the ability to give a sudden lunge of its body, driving a spine into the leg or hand of an unwary fisherman. Most injuries occur when the fish is being removed from hook and line, a diver's spear or from a commercial fisherman's net.

The venom gland associated with the spines is found in a shallow groove along the back edge of the spines and consists of a glistening white substance. Since the spines are not enveloped in a sheath and the venom gland is found at the base of the spines, the gland tissue usually does not become embedded in a puncture wound, as is frequently the case with the stingray wounds.

With most wounds from spiny dogfish, problems resulting directly from the vemon are of minor concern, according to Dr. Bruce Halstead in *Poisonous and Venomous Marine Animals of the World* (1970, U.S. Government Printing Office, Washington, D.C. 20401). Wound symptoms consist of immediate, intense pain, which may continue for hours. The pain may be accompanied by generalized reddening of the skin and severe swelling of the affected extremity. Tenderness may occur for several days.

Puncture wounds from spiny dogfish should be treated much like stingray wounds, described in a later section. The wound should be irrigated with salt water and bleeding should be encouraged. The extremity should be submerged in hot water for 30 or more minutes at as high a temperature as can be stood without injuring tissue. Suturing may be required and anti-tetanus agents should be administered by a physician. The injured limb should be elevated. Secondary infection can occur and may have to be treated with antibiotics.

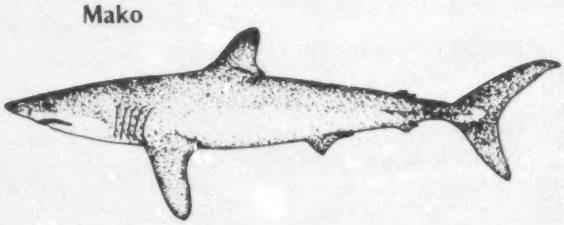


Atlantic Angel

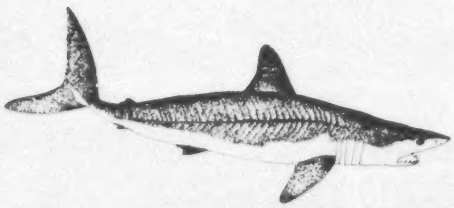
ATLANTIC ANGEL AND MAKO SHARKS

Two sharks merit extra caution when landed by anglers. The inshore species is the Atlantic angel shark, which moves along the beaches during spring and fall. Possessing good binocular vision, this flat-looking shark may snap at persons getting close to it on deck. The angel shark ranges from New England to Jamaica, being most common along middle Atlantic states in summer, but seldom is very abundant anywhere within its range. Reaching lengths of 4-5 feet (1.2 - 1.5 meters) and weights of 60 pounds (22 kilograms), these sharks feed on flatfish, skates, crustaceans and snails.

Mako



An offshore shark capable of beating up a boat if brought aboard while still active or "green" is the mako. It will also snap at persons on deck. The mako is considered an extremely dangerous shark to man. Its range extends from Georges Bank to the Caribbean, and it generally occurs offshore the mid-Atlantic region in summer. Makos are famous for leaping clear of the water under natural conditions and when hooked. Ranging up to 12 feet (3.7 meters) in length and reaching a weight of 1000 pounds (373 kilograms), the mako feeds on schools of mackerel, herring and squid. It is the only known natural enemy of the broadbill swordfish.



SHARK ATTACKS

Shark attacks, while not a significant problem in the middle Atlantic area, merit attention. For the sake of perspective, through 1973 the frequency of attacks worldwide was estimated to be less than 100 annually, with approximately 50% of those reported being fatal. This information is derived from the Office of Naval Research's Shark Attack File in which 1,165 attack case histories were analyzed. More than three times as many people in the United States die from bee stings or lightning in comparison, according to Perry Gilbert in "The Shark: Barbarian and Benefactor" (Bio-Science, Vol. 18: 946-950, 1968).

In recent years the frequency of attacks worldwide has declined to about 26 documented cases yearly, with less than one-fifth being fatal (Davis Baldridge, "What the Shark Attack File Tells Us" in *Sharks and Man: A Perspective, Conference Proceedings,* Florida Sea Grant Report No. 10, 1976). Through 1973 the Navy's Shark Attack File shows the following number of attacks to have occurred in waters of the middle Atlantic states: New York (8), New Jersey (17), Delaware (2), Maryland (0), Virginia (2) and North Carolina (3).

Only one shark attack has been documented in Virginia waters involving bathers and divers. This occurred in August 1973 at Sandbridge when a teenage boy was spearing crabs in about four feet of water. Blacktip sharks (probably *Carcharhinus limbatus)* had been sighted in the area for several days prior to the incident. The victim received severe lacerations on one arm. Another recorded incident involved a fisherman injured by a shark after it was boated off Willis Wharf on the Eastern Shore. Of the three North Carolina attacks, one was in September 1935 at Brown's Inlet near the New River, one in July 1957 at Atlantic Beach near Beaufort, and the third in August 1980 also near Atlantic Beach. Victims of the two earlier attacks died while the third victim received a leg injury.

Analysis of attacks from the Shark Attack File dispels some commonly held beliefs about why and who sharks attack. Of the 1,165 case histories studied, 50-70 percent of the attacks showed no direct relationship to the shark feeding. Field and laboratory observations have demonstrated that, once in visual range of a person in the water, sharks are attracted by bright, highly reflective pigments employed in some swimwear and diving gear. However, before coming within visual range of a person, a shark is likely aware of the person's presence through acoustic and/or olfactory cues.

Divers are more prone to attack than many people believe. The Shark Attack File indicates that more than 25 percent of the attacks studied involved underwater activities. Most diver victims were free divers using mask, snorkel and swimfins as compared to divers using SCUBA. Spearfishing was indicated as a provocative act leading to shark attack in 67 percent of the diver victims. Although divers are more prone to attack than swimmers, interestingly, divers incur fewer, less damaging injuries and exhibit a far lower mortality rate.

Some general advice to bathers and divers regarding sharks is offered by H. David Baldridge in *Shark Attack Against Man: A Program of Data Reduction and Analysis* (Contributions of the Mote Marine Laboratory, No. 155, 92 p., 1973).

---

* Never engage in your activity alone; always swim or dive with a companion. Avoid uneven tanning of the skin prior to entering the water, since sharks appear to respond to discontinuities in shading.

* Take notice of nearby offshore sandbars or reefs that might entrap a shark, especially at low tide.

* Avoid activity in the water at dusk or at night, since many species of sharks are searching for food at that time and may move closer to shore.

* Never provoke or molest a shark of any size or entrap one between yourself and any object such as a beach, sand bar, reef or boat.

* Avoid wearing bright colors and shiny objects in the water.

* Do not keep a captured fish, dead or alive, tethered to your body; remove all speared or wounded fish from the water immediately.

* Do not count on a shark circling or passing close at hand before making a direct attack run.

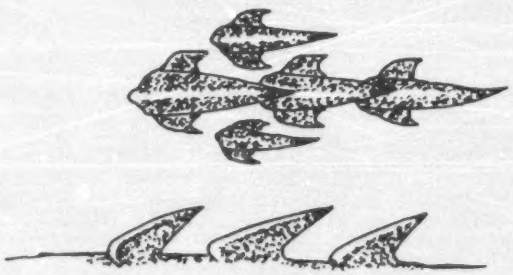
* Take no comfort in the sighting of porpoises; this does not mean that sharks are absent from the area.

If you happen to be the object of an attack, Dr. Baldridge suggests trying to fend the animal off without wounding it. Sharks often react vigorously to being stuck with pointed objects. Remember the limitations of spearguns, powerheads, etc., since improper use can simply further agitate a curious shark. If contact with a shark is imminent, it should be hit with the hands only as a last resort. Probing a shark's eye and sometimes its gills has been known to ward off attacks. Occasionally shouting underwater or blowing bubbles has likewise proven effective.

Remember: Most attacks produce wounds that are survivable. Efforts to control bleeding should begin even while the victim is still in the water. A physician should see the victim regardless of the severity of the wound, since minor wounds can lead to severe infection if not treated properly. Shock is a constant threat to a shark victim and appropriate steps should be taken to counter or treat it.

Denticles in shark skin, dorsal view

(Greatly Enlarged)



skin surface

As mentioned previously, sharks brought aboard boats or, for that matter found dead on the beach, need to be handled carefully. The shark's skin contains very sharp scales called denticles, which are toothlike in structure. If a person's skin comes in contact with a shark's skin against the grain of the denticles, serious lacerations can result. Larger specimens, when confined in a boat, have produced broken bones as well as cuts and bruises with their flailing tails.

Persons trying to extract jaws from dead sharks for either souvenir or scientific purposes can also suffer painful wounds. The teeth can easily puncture fingers. Sometimes even gloves don't provide total protection unless care is taken. Such wounds, especially if the shark has been dead for some length of time, can become infected from bacteria growing on the shark's teeth. An infected puncture wound of this type can be very persistent and difficult to cure, even with antibiotics.

The most important thing to remember about sharks in mid-Atlantic waters is that, although present in considerable numbers, they are not normally a threat to man except when handled carelessly or provoked. They must be treated with great respect since the only predictable thing about their behavior is that it is unpredictable.

STINGRAYS

Stingray-related injuries are also rarely reported in the middle Atlantic region. However, the past few years have witnessed an increase in abundance of these animals in the area and encounters with humans may increase. One effect of the increasing numbers of rays has been an increase in erroneous "shark sightings." Rays essentially "fly" through the water, normally at an easy pace. Frequenting shallow waters, their wing tips often break the water's surface for periods of several seconds, thereby producing the shark fin impression.

At least ten different ray species either regularly visit or stray into mid-Atlantic bays and sounds during summer and early fall (see "Biology and Identification of Rays in Chesapeake Bay" by J. Smith and J. Merriner, VIMS Educational Ser. No. 20 and "Rays in Chesapeake Bay," Poster, VIMS). Most feed in shallow water on muddy or sandy bottoms. Food consists of worms, shrimp, bivalve mollusks, snails, crabs and small fishes, which they crush or grind up with their pavement-like teeth.

Nearly all rays frequenting the region's shores have a venomous spine or spines enveloped in a sheath of skin on the top surface of their tails. This is strictly a defensive weapon. On the bottom side of the spine are two parallel grooves containing spongy material, which is the venom gland. The spine is constantly bathed in a film of mucus and venom. The bonelike spine retains its venemous attributes for some time, even after being severed from the ray's body. Skates, often confused with rays, do not have a stinger. The slight differences in appearance between rays and skates are described in Smith and Merriner's booklet. Rays most commonly observed in middle Atlantic coastal waters are the bluntnose stingray *(Dasyatis say)*, cownose ray or bullfish *(Rhinoptera bonasus)* and roughtail stingray *(Dasyatis centroura)*.

Bluntnose

BLUNTNOSE STINGRAY

The bluntnose stingray, probably most common of the three, has its stinger located some distance from the base of the tail. Because it comes into shallow water and lies partially buried on the bottom, this ray can be stepped upon by unwary swimmers or waders. When this occurs, the ray is pressed against the bottom, affording it the necessary leverage to arch its tail and puncture the victim's leg or foot with its stinger. Shuffling the feet along the bottom while wading will greatly reduce a person's chances of stepping upon this type of ray; it prefers a hasty retreat to an encounter with humans.

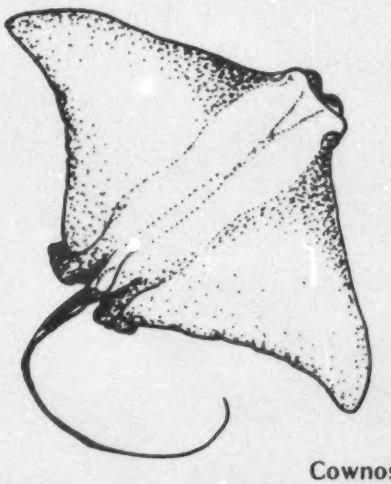
The bluntnose ray ranges from southern Brazil in winter to New Jersey and sometimes Cape Cod in summer. It normally is observed in Chesapeake Bay during June through October where it occurs from the shoreline to deep channels. Maximum size across the wings has been reported to be 36 inches (91.4 centimeters).

COWNOSE RAY

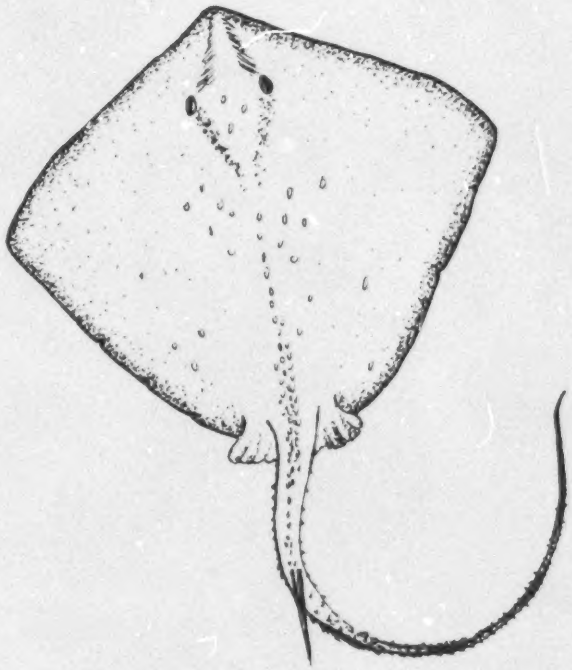
While injuries to swimmers from the bluntnose ray are rare, injuries attributed to cownose rays are more rare. This animal swims almost constantly and generally doesn't rest on the bottom. It normally is observed near the surface in schools of 5-10 or up to several hundred individuals. This ray ranges from middle Brazil in winter to southern New England in summer.

Cownose rays are hooked fairly frequently by anglers and care must be taken when handling them. Located at the base of the tail, the venomous stinger can puncture or tear flesh upon contact. However, because the stinger is close to the body rather than out on the tail, it does not pose as much threat as that of the bluntnose and roughtail stingrays. Because the ray's wingtips are good to eat and the animal puts up a challenging fight on a hook and line, encounters with sport fishermen may increase (see "Rays in Chesapeake Bay" by J. Smith and J. Merriner, VIMS Marine Advisory No. 14 and "Cleaning and Preparing the Cownose Ray" by Merriner and Smith, VIMS Marine Advisory No. 18).

Cownose rays average 30 pounds (11.2 kilograms) in weight and are difficult to handle when landed because of their strong "flapping" movements. Rather than trying to remove a hook from a landed ray, cut the leader just beyond the mouth and remove the hook later. The largest individuals may reach 45 inches (1.1 meters) across and weigh more than 50 pounds (18.6 kilograms).



Cownose



Roughtail

ROUGHTAIL STINGRAY

The roughtail stingray is likely the largest ray frequenting middle Atlantic coasts, having a maximum recorded width of nearly seven feet (2 meters) (New Jersey and Gulf of Mexico specimens). Only the Atlantic manta ray, an infrequent visitor to the same waters, exhibits greater size, reaching widths of 20 feet (6 meters).

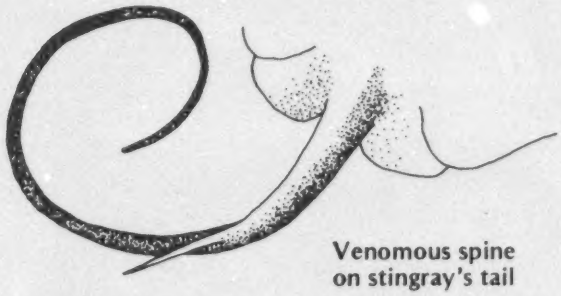
Roughtail rays inhabit deeper portions of bays during summer. Half-grown or larger specimens are easily recognized by the large "thorns" or "bucklers" on the sides of their tails. As with the bluntnose ray, the sting (or stings; some have two) is located nearly one third of the way down the length of the tail. This makes the ray potentially more dangerous, since an arching tail can bring the sting in contact with an angler's legs when the ray is boated. For large catches, cutting the leader and releasing the ray is advised rather than attempting to bring it aboard. The wings of smaller rays, like those of the cownose ray, can provide good eating.

Roughtail rays are most abundant in summer

from Cape Cod to New Jersey, the northern portion of their range. Declining water temperatures mark the rays' migration southward where they winter off the coast of the Carolinas and in the offshore waters of Florida.

TREATMENT OF STINGRAY WOUNDS

If a stingray injury occurs, first aid measures should be followed as outlined by Dr. E. T. Roche in "Venomous Marine Fishes of California" (Marine Resources Leaflet No. 4, Dept. of Fish and Game, 1416 9th Street, Sacramento, California 95814):



Venomous spine on stingray's tail

1. Wash the wound with available cold salt water. Remove any pieces of the sheath or venom gland which may remain in the wound. These may look like shreds of grey mucus.

2. After cleaning and removing all foreign material, submerge the extremity in hot water, as hot as the patient can tolerate, for 30 to 60 minutes. Heat appears to inactive the venom. Epsom salt may be added if available.

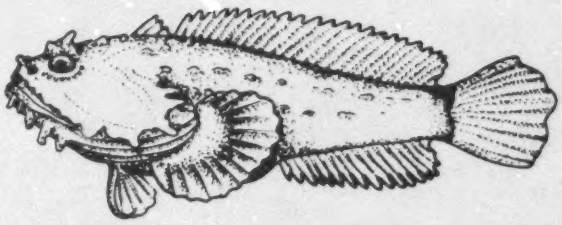
3. Make a second inspection for foreign matter around the wound.

4. If pain and swelling do not subside within a reasonable amount of time (1-2 hours), a physician should be consulted. These wounds are often prone to secondary infection.

5. Suturing by a physician may be required if the wound is sufficiently large.

6. Antibiotic and anti-tetanus injections are often recommended by physicians.

UNASSUMING PROBLEM FISH AND CRABS



Oyster Toad

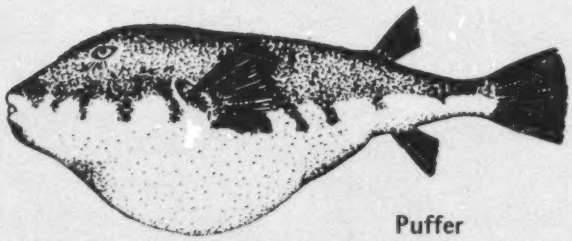
The toadfish *(Opsanus tau)*, a common inhabitant of shoal waters from Maine to Cuba, characteristically erects the first two dorsal fin spines along its back when handled. These spines are covered with a sheath of skin and, like similar spines on the gill covers, can cause painful puncture wounds for the unwary fisherman. The recommended method for handling a hooked fish is to grasp it from underneath in the gills, thereby avoiding contact with the spine areas altogether.

Oyster toads also sport a strong set of jaws and a set of somewhat blunt, conical teeth. The fish nearly always snaps its jaws shut when a hook is being worked out of its mouth. Pliers rather than fingers should be used to remove the hook. The force of the jaws is considerable and swimmers should be wary of putting their feet into bottom depressions. These are favorite resting places for toadfish as well as blue crabs, and both animals will readily clamp down on objects thrust at them.

Toadfish spine punctures, as with most fish spine injuries, commonly exhibit secondary infections. To reduce this possibility mild wounds should be washed thoroughly and bleeding encouraged to help rid the wound of fish mucus and bacteria. In the case of more severe wounds and when there is suspicion that part of a fish spine is broken off in the wound, a physician should be consulted.

Dr. Bruce Halstead in *Poisonous and Venomous*

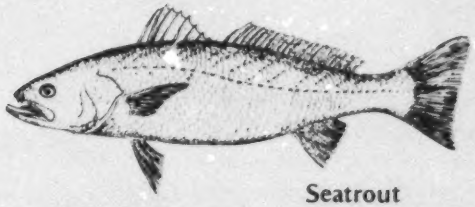
Marine Animals of the World lists the toadfish among the venomous toadfishes. However, he states that while several authors report the fish to produce venom in association with the dorsal and gill cover spines, two authors also report that the fish does not possess venomous spines. One of the latter authors reports having been struck numerous times without toxic effects.



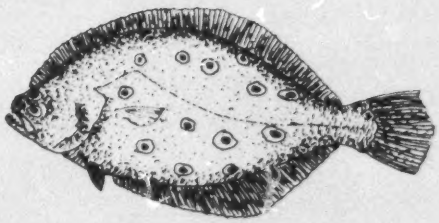
Puffer

Another fish periodically abundant in mid-Atlantic inshore waters has a potential toxicity problem. This is the puffer, swell or sugar toad *(Sphoeroides maculatus)* which ranges from Florida to Cape Cod and occasionally Maine. This fish is included in Dr. Halstead's list of venomous fishes, and related Japanese species have been documented as the cause of human fatalities. In the United States only one fatality has been attributed to eating puffer. The incident occurred in Florida during 1963 and the species of puffer involved was not identified. The skin of the fish is considered to produce toxic substances along with various organs, particularly the liver and kidney. The meat, however, is quite tasty and safe if handled properly, and when available is marketed as "sea squab."

The traditional method used in the area to clean this fish avoids all toxicity problems. The fish should be laid on its belly and a vertical cut made behind the gill openings severing the backbone and cutting through the meat to the skin. The skin on the underside of the fish should be left intact. Then, by bending the head down and pulling the skin towards the tail, all skin and viscera can be peeled away from the whitish meat and discarded. Care should be taken that this process removes the kidney located near a bloodstreak running along the bottom of the backbone. The meat should be immediately washed and completely cleansed of any remaining organs and extraneous matter. This cleaning method is recommended in "Don't Waste That Fish" by D. Berg, T. Miller and F. Thomas (University of North Carolina Sea Grant Publication, UNC-56-75-23; available at VIMS).



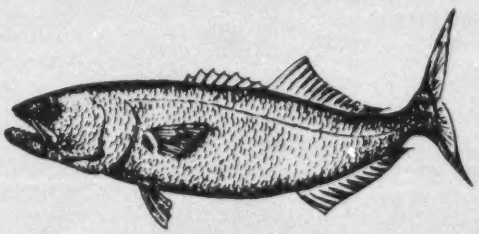
Seatrout



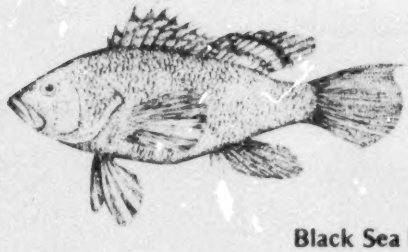
Flounder

The "sharp teeth" problem warrants some attention from inexperienced saltwater anglers. Bluefish, summer flounder and seatrout (weakfish) all sport impressive teeth and care should be exercised by anglers in handling these species. Primarily inhabitating rocky areas and wrecks, tautog and its more northern cousin the cunner must be respected for their jaw strength and formidable teeth. The heavy lips of these fish cover stout conical teeth used in eating barnacles, blue mussels and crabs.

Bluefish



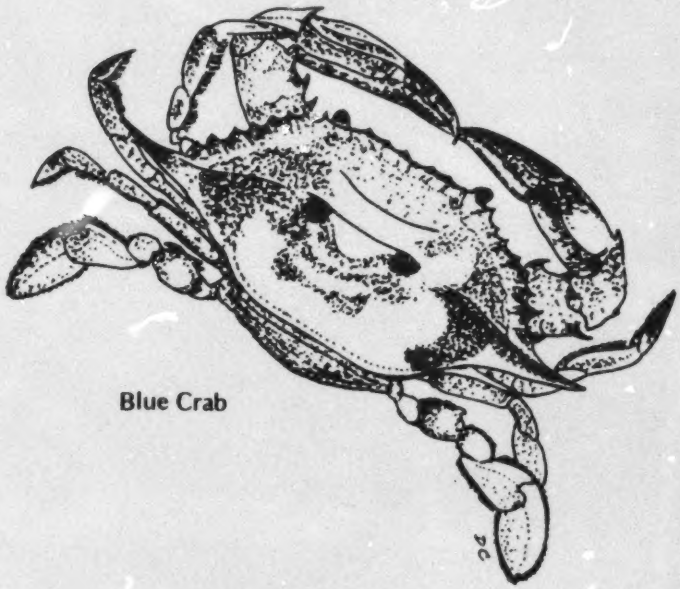
Bluefish require particular care since they continue snapping their jaws even after being landed. Persons not familiar with this fish also need to be made aware that when a school of blues is feeding they will strike at anything that moves, swimmers included. Swimmers should be warned to leave the water temporarily if a bluefish school moves into the swimming area. Bathers have been known to be slashed on fingers, arms and legs by blues feeding in the Atlantic surf.



Black Sea Bass

One mild warning is offered about gill cover or opercular spines. The croaker (hardhead), a coastal panfish popular from Chesapeake Bay to southern New Jersey, has numerous sharp spines or burrs along the edge of the gill cover ridge closest to its eye. A popular offshore fish for head boats, the black sea bass, also has sharp spines on the rear portion of its gill covers. When either unhooking the fish or handling them during cleaning, these spines can inflict small lacerations on the hands. Almost unnoticeable at the time, these small cuts can cause hands to become sore and stiff later, particularly if many fish are handled. By gripping these fish in the gills or using cotton gloves, this problem can be avoided.

It goes without saying that people inexperienced in handling blue crabs should seek out a knowledgeable individual to demonstrate the proper method to hold this animal. Otherwise, experience is a hard but rapid teacher. Only by firmly grasping the crab at the base of its fifth or paddle-shaped leg can one expect not to get nicked.



Blue Crab

REFERENCES

In addition to the references cited in the text, useful information on hazardous marine animals can be found in the following publications:

Baldridge, D. A. 1974. *Shark Attack,* Berkeley Medallion Books, Berkeley Publishing Corp., N.Y. 263 pp.

Calder, D. R., N. H. Cones and E. Joseph. 1971. *Bibliography on Scyphosa with Selected Refe-ences on Hydrozoa and Anthosoa.* Virginia Institute of Marine Science, Special Scientific Report No. 59, 142 pp.

Casey, J. G. 1964. *Angler's Guide to Sharks of the Northeastern United States: Maine to Chesapeake Bay.* Bureau of Sport Fisheries and Wildlife Circular No. 79, Wash., D.C. 32 pp.

Fischer, W. (ed.). 1978. FAO Species Identification Sheets for Fishery Purposes, Western Central Atlantic, Fishing Area 31, *Sharks,* Vol. V. Food and Agriculture Organization of the United Nations, Rome.

Halstead, B. W. 1959. *Dangerous Marine Animals.* Cornell Maritime Press, Cambridge, MD.

Hoese, H. D. 1962. "Sharks and Rays of Virginia Seaside Bays." *Chesapeake Science,* 3:166-172.

McCormick, H. W., T. Allen and W. E. Young. 1963. *Shadows in the Sea: The Sharks, Skates and Rays.* Crown Publishers, Inc., N.Y. 415 pp.

Ronsivalli, L. J. 1978. "Sharks and Their Utilization." *Marine Fisheries Review,* Vol. 40 (2), 13 pp. (available through VIMS).

Russell, F. S. 1970. *The Medusae of the British Isles.* II. Pelagic Scyphozoa with a Supplement to the First Volume on Hydromedusae. Cambridge University Press, Cambridge, N.Y. 284 pp.

Russell, F. E. 1971. *Marine Toxins and Venomous and Poisonous Marine Animals.* Tropical Fish Hobbyist Publications, Inc. Neptune City, N.J. 176 pp.

Schultz, L. P. and D. G. Cargo. 1971. *The Sea Nettle of Chesapeake Bay.* Univ. of Maryland, Natural Resources Institute, Educational Series No. 93, Chesapeake Biological Lab, Solomons, MD., 8 pp.

Schwartz, F. J. and G. H. Burgess. 1975. *Sharks of North Carolina and Adjacent Waters.* Information Series, North Carolina Dept. of Natural and Economic Resources, Division of Marine Fisheries, Morehead City, N.C. 57 pp.

Seymour, H. H. and K. S. Danberg. *Shark.* Univ. of Delaware, Sea Grant Advisory Service Bulletin, Del. 6 pp.

Wass, M. *et al.* 1972. *A Checklist of the Biota of Lower Chesapeake Bay.* Virginia Institute of Marine Science, Special Scientific Report No. 65. 290 pp.

Watling, L. 1978. *Jellyfish Regular Summer Visitors to Delaware Shores.* Univ. of Delaware, Sea Grant Marine Advisory Services Pub. No. 7, Lewes, Del. 4 pp.

The College of William & Mary

VIMS
SEA
GRANT
PROGRAM

Educational Series No. 26